Note: For battery replacement use any brand CR2032, 3-volt, lithium battery such as Duracell, Eveready, Radio Shack, Sanyo, etc. Be sure to insert positive side up as marked on battery holder.

A N G E L C I T Y A U D I O

2 LIBERTY PLACE, MIDDLETOWN, CT. 06457 (203) 347-5166

TURBO-DW OWNER'S MANUAL

4th edition

BY

JIM FELLOWS

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I: INSTALLATION

IMPORTANT!!!! DO NOT TOUCH TURBO OR REMOVE IT FROM THE PACKAGE UNTIL YOU READ THE INSTALLATION INSTRUCTIONS!!!!!!

The installation of TURBO is surprisingly simple, and that is one of its beauties.

There are no special skills or tools required, although a ROM extractor, which is available from Radio Shack type stores for a few dollars is helpful. A phillips head screwdriver is required. If you do not have a chip extractor, use the plastic prong on the cap of a Bic pen instead. In general, never use any metallic object to pry out an integrated circuit chip, since it could be magnetized and destroy the programming of the chip. A flashlight may come in handy.

The main thing to be cautious of is static electricity. If a discharge of static electricity makes contact with TURBO or any of the internal components of your DW 8000 it might damage the components. In order to avoid this please read the following carefully.

Static electricity is less likely to build up in a humid environment. It is most likely in dry environments caused by winter heating when cold air from outside is heated inside the home and needs far more moisture to maintain its relative humidy levels than it did outside. If you experience static electricity discharges in your home you will certainly need to take precautions. Fortunately these are all quite simple. Humidify your work area by boiling water until condensation forms on the windows. Avoid wool and other static causing materials. Avoid carpeted areas. Do not wear a sweater! If static is still a problem you will need to ground yourself before working inside the DW or touching TURBO. In no case ground yourself if you will be touching anything remotely connected to electricity! Unplug all electrical connections first and do not touch anything connected to electricity. Better yet, use the saftey grounding straps available at Radio Shack, which only ground the small type of discharges associated with static electricity. By observing these precautions you needn't worry about static. Static electricity is not likely to cause any problems during the Turbo installation, nor is the TURBO board especially sensitive, but it is wise to take precautions when working on all integrated electronics components.

1) Make a backup copy of your sounds on tape ! Sounds will not normally be lost when installing Turbo, but it could happen accidentally or if it becomes necessary to do the "initialization" procedure.

2) Disconnect all cables and power cords from the DW. Make sure it is cool. If it has recently been used, wait until it cools down.

3) On a clear work table, turn the DW upside down but be careful not to break the joystick. It is safer to let the joystick hang over the edge of the table. Have the front (key side) towards you so that the joystick is now on your right, face down.

4) Note the positions of the 5 large screws on the raised portion of the back panel and note the two sizes used all around the edge. Before removing the five large screws and the two types of screws around the edge, please note their locations with tape or pencil so that you will know which screws go where when you replace them. Remove these screws. Do not remove the four rubber feet or the 4 smaller screws located to the left and right of the rear left rubber foot.

5) Grasp the DW at either end and hold the top and bottom halves together while turning it back right side up. Let it rest on the table on its rubber feet so that the keyboard is facing towards you. The joystick is on the left now. Make sure the left side, including the joysticks, hangs over the edge of your work table.

6) Stop! Before opening the DW you should understand that the top half is rather heavy and is connected to the bottom by several wires and bundles of wires. The most common problem in Turbo installations are caused by accidentally tugging on these wires and straining connections. There is one set on the right which is connected to the power supply near the on/off switch on the back panel. The most delicate set is on the other end, near the audio output jacks. There is also a set of bundled wiring harnesses in the center of the back panel. The amount of slack in any of these wires may vary between instruments. Proceed slowly and very carefully. Lift up the top half, containing the keyboard and control panel just enough to detach it from the lower half. Try not to jerk it and slowly lift up the front so that you can see inside. Note the wires and watch them as you proceeed so that you can see that they are not being strained. You are going to lay the top section down, back to back with the front, so that it's components are exposed (facing up.) In some DW's this may not be possible if the wiring is too tight. In that case you should have a friend hold the top in the vertical position while you do the installation. You might also consider placing a book or other object under the top half to keep it an inch or two above the table. Be careful not to break the joystick. The lower half is now facing you and exposed for the installation of TURBO. In no case should you unplug any wires! If you accidentally unplug any connectors, you may have difficulty getting a good contact when they are re-connected because the wires can be pulled away from the metal contacts inside the plugs. This will prevent current from flowing even though the plug is in the socket. Disconnecting

certain wires can scramble the memory contents and the DW will require re-initialization. Disconnecting the set of blue and white wires (or pulling them away from contacts inside the plug) will disconnect some keys on the keyboard. Being careful with these wires will insure that your installation is easy and trouble free.

7) You should now orient yourself: You are facing the DW's lower half from it's front. You will observe a large green component board at the left, another similar one in the center and three smaller components at the right. All of the following pertains only to the green component board in the center.

8) Note the round lithium battery in the center of the board. Between this and the right edge you will see that there is one IC chip that is different from the rest. It is in a socket instead of being directly connected to the board. This is the ROM chip which is designed to be replaceable. This is the chip that you will remove, and you will install Turbo in its socket.

9) Remove the ROM and be careful not to damage its delicate pins in case you wish to use it in the future. Place it inside the plastic TURBO box for storage. Try to avoid handling the tiny connector pins on this chip and on the TURBO -DW, since the oil left behind can cause corrosion. If you don't have an IC extractor, carefully pry up the chip from either end with the plastic prong on a Bic pen cap. Try not to damage this chip or its pins.

10) When the ROM chip is successfully removed, you are ready to install the TURBO-DW. You may carefully remove it from its package. Examine it if you are curious, but don't touch the two rows of metal extension pins on the bottom side. The foam material inside the plastic box is an anti-static material and this is a good place to store your KORG ROM chip. On the TURBO board you will see a replaceable battery, two RAM memory chips and a ROM chip directly behind the battery. The ROM chip contains all of the software that controls the DW/TURBO operation (it too is removeable). The RAM chips are for the expanded memory. The independent battery allows for the seperate protection of all TURBO memory, even when the board is not installed in a DW. Observe the cable and plastic plunger clip. Do not pull or break this jumper cable. Hold the board so that the round lithium battery is at the forward left side. This is the position it will have (relative to <u>you</u>) when pluged into the DW-8000. Be certain not to plug the board in backwards! The DW-8000 will not function if it is installed backwards.

11) Carefully line up the fourteen pins in each row with the socket. Make sure all pins are aligned before pressing them into the socket. Use the plastic pen cap to make delicate adjustments if necessary. Don't try to insert the extension pins into the socket yet, just make sure they are all lined up. You should sight along the 2 rows of pins at eye level to make sure they are all straight and going into the socket. A flashlight is very handy here! Once you are certain of alignment, you can begin to insert TURBO in this manner: hold the edge of the TURBO board gently in one hand, and use the thumb of the other hand to press down

directly on the large chip that is directly behind the round lithium battery. Press down on the center of that chip only.

Slowly press the board down into place, a bit at a time, watching the pins to make sure all are aligned and do not bend or get crushed. Do not apply pressure to any other place on the board, since this could crack the board. Relax and take as much time as you need to gradually insert the pins into the socket. Start gently, until you are sure that all the pins are aligned and started into their sockets. Then use firmer pressure to seat the installation. You will need to apply strong pressure to get the pins all the way into the socket. Do it this way: Once the board is started and you have double-checked alignment with a flashlight, use both thumbs to press directly downward on the large chip that is directly behind the round lithium battery. This will cause the DW's circuit board to bend. It looks scary when it bends, but if you press down as decribed, it's OK! Just don't pound or hit with a hammer! Press with your thumbs as described using as much weight as necessary. Go slowly and check often to see if it is all the way in. If it goes almost all the way and then stops, that's OK, as long as the gap isn't thicker than about 5 or 6 sheets of paper. Make sure both rows are even! If the TURBO-DW is not fully installed, it will not function or will function unreliably. Or it may stop working some day after you have moved the DW or when you hit the keys hard. It may even come out when you close the DW. So take your time to get it all the way in!

12) The pins on the TURBO-DW are intentionally larger than those on the original ROM chip in order to hold TURBO securely in place.

13) Now locate the point of connection for the address bus clip. Observe a large chip with many feet that is directly behind the center of the TURBO board. To the left of that component you will see 6 smaller chips that are all very similar to each other and arranged in two rows of three each. Some of these have 14 pins others have 16. The one you are looking for is in the rear center and has 14 pins, white printing on the circuit board identifies it as IC number 29 ("IC29"). This number is printed on the circuit board on the far side of the chip. The chip will have the following identification printed directly on it: SN74HC32N.
This is the chip you are looking for. Observe the pin closest to you on the right side. You will attach the hook from the plunger clip around this pin. Be sure that you double check afterwards to be sure that you actually connected to this pin! There are many pins and many chips, it's easy to look away and then look back at the wrong chip!

14) Handle the jumper cable carefully, do not twist or bend it roughly! Hold the plastic plunger and experiment with it's operation. Note that a tiny copper hook sticks out when the plunger is pressed fully. Make sure the cable is straight and untwisted and that the copper hook has its open side towards the front of the DW (towards you). This hook inserts from between the pin we previously identified and the one directly behind it. You will probably have to carefully turn the copper hook (now extended) a bit to get it between the pins and then re-adjust it to get the hook around the front pin. Once in place you can

release the plunger and it will remain securely and definitely attached to that pin, unable to wiggle free or touch any other pins. The plastic shaft of the clip will point up in the air at an angle in the direction of the right front. You should check this to make sure the clip is secure and will not wiggle free. Those who are technically inclined may be tempted to solder the jumper and dispense with the clip. This is not recommended nor necessary. In no case should it be done until you are certain the TURBO is installed and working correctly. If the plastic plunger is correctly installed it won't come loose no matter how much the DW is shaken.

15) Before closing the DW, make sure that you have securely connected everything to its correct location and that everything is in order. Re assemble the DW. You may wish to wait until after you have checked the power-up test before inserting the screws. Just remember to hold the two-halves together securely when turning the DW right side up.

16) Turn on the DW and make sure the message 8008 appears in the display when the power is turned on. This replaces the original "8000" display. After a few seconds, the display will show the regular patch and parameter information, as usual. If the display "8008" does not appear,turn it off immediately and check your work for errors. By the way, once TURBO is installed, the DW will remember what patch number was called up when the DW was turned off and it will select this patch when it comes back on.

INITIALIZATION:

If the 8008 display does appear, then the TURBO board is correctly installed and you can go on to the initialization procedure. In many cases initialization will not be necessary and TURBO will be ready to use as soon as it is installed. However, you may use this procedure to eliminate garbled data that results from problems that may have arisen during TURBO-installation or from any other source of problems such as a dead battery, etc. Initialization will erase all of the patches that were in the DW-8000 before initialization, but it will not erase any banks that may be stored in the TURBO-DW. You should follow this procedure any time TURBO has been accidentally disconnected while the power was on or if the display shows garbled or strange characters. If garbled display persists after initialization, you have made some error in installation and may wish to call for advice.

To initialize the DW 8000: Turn power off. Press the 5 and 8 buttons and hold them down while you turn the power switch on. You must hold these buttons down until the 8008 display changes to 11-11-16. This will erase all memory in the DW and replace it with a legal set of blank patches with all parameters set to their lowest values. These patches will not make any sounds. The purpose of initialization is to remove garbled data that will confuse the DW's operating procedures and to clear garbled characters from the display. TURBO is normally sold with all 8 banks filled with blank (initialized) patches. Ocassionally you might find some patches there that were used to test it's memory and not erased before shipping.

You have successfully completed and verified your installation!

If you have problems not explained by the manual please call! Most problems are easily solved in a few minutes with a simple explanation and instructions if you give us accurate and complete information about the problem. Don't try to guess, just tell us exactly what happened!

You are now ready to load sounds into the eight memory banks. Be sure to read the entire section on memory before loading sounds into the DW! I strongly suggest taking an hour to read the entire manual before beginning to use the Turbo-charged DW. Congratulations,you are now the owner of a unique and wonderful synthesizer!

If you are uncertain about your ability to open the DW and handle its components carefully, please refer the installation to a qualified technician. We highly recommend that in such case you select an authorized KORG service center. This is not the same thing as an authorized DEALER. KORG will be happy to give you the name of a service facility near you if you call them at 1-800-645-3188. Obviously, TURBO-DW is the product of Angel City Audio, not KORG, and any technical or support calls should be directed to us. Remember to bring the instruction manual along with the kit! Unfortunately, most service technicians will not want to take the time to read and understand the Turbo installation instructions. Please find a technician who will cooperate. We highly recommend that you do the installation yourself. You will probably do a better job than the average technician who will not read the instructions and will therefore not install the TURBO fully in the socket. This will invariably lead to problems later on.

ANGEL CITY TELEPHONE SUPPORT: 8am-4pm eastern time, mon-fri. 203-347-5166.

INSTALLING THE INDEX LABEL: This peel-off backing type label is designed to attach directly to the right of the blue DW 8000 logo. It will cover the smaller "programmable waveform" text. Test the location and then remove only a tiny piece of the backing paper at the left edge. Do this by cutting off a tiny strip of backing with a pair of scissors and then laying the paper back over the adhesive. Once the adhesive touches the DW it will not be possible to remove or adjust it. Attach this corner, then check alignment before gradually peeling off the rest of the backing. Work slowly from left to right to remove any air bubbles as you go. Replacement labels are available for $1.00 each.